

Dr. Sukanya

ASSESSMENT OF QUALITY OF **MATERNAL AND CHILD HEALTH CARE**

ORGANISED BY



**THE DEPARTMENT OF BIOSTATISTICS,
CHRISTIAN MEDICAL COLLEGE,
VELLORE - 632 002**

AND



**THE INSTITUTE FOR RESEARCH IN MEDICAL STATISTICS,
CHENNAI - 600 031**



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ASSESSMENT OF QUALITY OF MATERNAL AND CHILD HEALTH CARE

EDITED BY

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From the Editor's desk ...

The Reproductive and Child Health Care which is a holistic form of Maternal and Child Health Care with more emphasis on total health of women and children has been the focus of attention of many health programme organizers both at the Governmental and non-Governmental levels. One of the key areas in which Medical Statisticians, demographers and health workers are involved is evaluation of health programmes such as the assessment of quality of Maternal and Child Health Care. In general, a programme evaluation traditionally involves measurement and assessment of the effort, performance, adequacy of performance and efficiency. Effort refers to the input made by the organizers for running the programmes. It may be given in terms of amount of money expended, number of clinics opened, number of items stocked and the number of hours worked and so on. The aspects of performance may be summarized in quantitative terms on the use of such facilities by the clients; for example the number of cases utilized the services, the number of success stories, the trend in the attendance and so on. Adequacy of performance relates to the proportion of target attained, if the programme is target - oriented; for example, it may mean the proportion of children immunized through the programme, the proportion of pregnant women covered by the antenatal check-up, the proportion of drugs utilized by the clients and so on. The efficiency is measured in terms of comparison with an alternative approach of a programme. In all these areas there is enough room for qualitative and quantitative appraisal. Assessment of quality of Maternal and Child Health Care not only covers these classical areas but also the latest and innovative approaches.

It is well known that the UNICEF has been giving priority for such programmes both at the service and implementation levels and also at the assessment and evaluation levels. It had sponsored the activities related to use of biostatistics in the area of Maternal & Child Health Care during the XVI Annual Conference of the Indian Society for Medical Statistics held in Vellore from November 19 to 21, 1998. To be more specific, the UNICEF has given financial assistance for conducting a special seminar on "Assessment of Quality of Maternal & Child Health Care". Experts from various specialties were invited for this special seminar to make presentation of their thoughts and ideas and focus them to the main group of the audience, the users of health statistics. The following persons were invited to give special talks during the seminar:

1. Dr.P.P. Talwar
(Former Prof. and Head, Dept. of Statistics,
National Institute of Health & Family Welfare)
Consultant
B-1/1027, Vasant Kunj, New Delhi.
2. Dr. Sheela Shenoy
Associate Director of CERTC
Medical College, Trivandrum, Kerala.

3. Dr.M.K.C. Nair

Director,
Child Development Center
Medical College, Trivandrum, Kerala.

4. Dr.N.S.N. Rao

Consultant
Technical Support Unit
United Nations Population Fund
New Delhi.

5. Dr. Sulochana Abraham

Professor
Department of Community Health
Christian Medical College
Vellore.

Dr.P.S.S.Sundar Rao, Director, Schieffelin Leprosy Research and Training Center, Karigiri - 632 106 had been invited to be the Chairman of this seminar and Dr.M.Kachirayan, Deputy Director, Institute for Research in Medical Statistics, Chennai had been invited to lead the discussion.

Unfortunately due to health reasons Dr.P.P.Talwar was unable to attend the seminar but he sent the paper on "Measurement of Quality of Maternal and Child Health Care". As a demographer and biostatistician he has gone into the breadth and depth of the programme regarding quality assessment. The paper on "Measurement of Quality of Care in RCH Programmes - A Review" by Dr.N.S.N. Rao contains various aspects in this recently christened Reproductive and Child Health Care Programme. Dr.Sheela Shenoy's paper on "Assessment of Quality of Care and Evaluation of Maternal Health Programmes" has touched a new dimension in the assessment of Maternal Health Programmes. The paper of Dr.M.C.K.Nair presents the Child development aspects - the qualitative information appealing for those who are interested in the Child development and its quality. Finally the quality assurance programme of Maternal and Child Health implemented by the CHAD (Community Health And Development) programme of Christian Medical College was presented by Dr. Sulochana Abraham. She has brought into focus the field expertise and the related assessments. The session went on interestingly and it was highly appreciated by the delegates and the participants Dr.M.Kachirayan led the discussion.

All these contributions including Chairman's remarks and discussion are published in this booklet which, I hope, will be kept as a reference material by the Medical Statisticians and the Health Personnel who are working in the field of Reproduction and Child Health. We express our deep gratitude to the UNICEF for financing this session and related activities. We also thank the Chairman of the session Dr.P.S.S. Sundar Rao and the contributors Dr.P.P.Talwar,

Dr. Sheela Shenoy, Dr. M.K.C. Nair, Dr. N.S.N. Rao, Dr. Sulochana Abraham and Dr. M. Kachirayan. I once again express my heartfelt thanks to UNICEF, specially Dr. Stephen Atwood and Dr. Sanjeev Kumar at New Delhi and Dr. V.L. Srilatha at Madras for sponsoring the session and to Dr. M.D. Gupte for facilitating the finance for the session. I thank Mr. S. Muthurathnam and other staff of the Department of Biostatistics who helped in preparing this booklet.

Dr. J. Richard

Professor & Head

Department of Biostatistics

Christian Medical College

Vellore - 632 002

Speakers

Dr. P. B. Talwar, New Delhi

Dr. N. S. N. Rao, New Delhi

Dr. Sheela Shenoy, Trivandrum

Dr. Sulochana Abraham, Vellore

Dr. M. K. C. Nair, Trivandrum

Dr. M. Kachirayan, Chennai

Discussion

Chairman's Concluding

Remarks

The views expressed in this document do not reflect those of either the ISMS or the UNICEF

XVI ANNUAL CONFERENCE OF THE INDIAN SOCIETY FOR MEDICAL STATISTICS

Department of Biostatistics

Christian Medical College, Vellore - 632 002

Seminar on

ASSESSMENT OF QUALITY OF MATERNAL AND CHILD HEALTH CARE

November 19, 1998

PROGRAMME

Chairman

Dr. P.S.S. Sundar Rao

**Chairman's Opening
Remarks**

Speakers

Dr. P.P. Talwar, New Delhi.

Dr. N.S.N. Rao, New Delhi.

Dr. Sheela Shenoy, Trivandrum.

Dr. Sulochana Abraham, Vellore

Dr. M.K.C. Nair, Trivandrum.

Discussion

Dr. M. Kachirayan, Chennai.

**Chairman's Concluding
Remarks**

CHAIRMAN'S OPENING REMARKS

(Dr. P.S.S. Sundar Rao

Director

Schieffelin Leprosy Research & Training Center

Karigiri - 632 106)

Often programme managers emphasize more on reaching targets at the cost of quality. In our eagerness to extend and expand any health intervention programme, it is essential that we do not compromise the quality of service. In maternal and child health services, improvement and maintaining quality is equally important as coverage of services. Thus MCH programmes should build into its framework, routine measurement of quality of care.

In this seminar, the focus is on 'Assessment of Quality' and there will be presentations by experts followed by discussion by all the participants. We hope the seminar will bring out several issues related to measuring the different dimensions of quality of services offered to women and children. As Biostatisticians we are always involved in measuring, summarizing and describing phenomena, which in this case is qualitative variable. This in itself is challenging to the statistician and we hope the seminar will enlighten with the definitions, indicators and the process of assessing quality of MCH services. We are glad that some of the presentations are by practising medical experts who will be sharing their own experiences in the field. I am sure this seminar will prove valuable to all concerned and would help MCH programme managers to ensure quality services.

About the Contributors ...

Dr. Prem P. Talwar

Dr. Prem P. Talwar possesses a Master's degree in Mathematics and Statistics, and a Diploma in Demography (from the International Institute for Population Sciences, Bombay). He acquired his Ph.D. in Statistics and Demography from the University of North Carolina at Chapel Hill, USA in 1970. He had worked with Ford Foundation, India and the Ministry of Health & Family Welfare on population programme of India. He had taken up assignments as Senior Research Associate in Columbia University, New York (1972-75) and the Family Health International, Research Triangle Park, NC, USA (1975-78). He took charge as Director of the Population Center, Lucknow in 1978. He then joined the National Institute of Health & Family Welfare (NIHFW). He took voluntary retirement from his position of Professor and Head, Department of Statistics and Demography, in NIHFW in 1994. Since then he has been working as a freelance consultant with various national and international organizations like World Bank, UNFPA, USAID and Population Council on issues of family welfare and reproductive health. He is currently an Adjunct Professor in the School of Public Health, University of North Carolina at Chapel Hill, NC, USA.

He has been heavily involved with the population activities of the country in the capacity of teaching, research and advisory. Dr. Talwar has attained a high professional status among the national and international group of demographers. He has over 75 papers published in national and international journals and 10 books to his credit. His areas of interest are technical demography, fertility, MCH, family planning, evaluation / surveys and management information system.

Dr.N.S.N. Rao

Dr.N.S.N.Rao is currently working as a Technical Advisor in the Health Management Unit of UNFPA, at New Delhi. He holds a Ph.D. degree in Statistics applied to Health Management. He is well known for his contributions to Statistics which extends over a period of forty years. He had worked as a Professor of Statistics at Banaras Hindu University. He was also a Management Consultant at Indian Institute of Management, Bangalore.

Dr.Sheela Shenoy

Dr.Sheela Shenoy is the Associate Director of CERTC in the Medical College at Trivandrum. She holds MD degree in Obstetrics & Gynecology and M.Phil. in Clinical Epidemiology & Biostatistics.

Her areas of research include maternal care monitoring, KAP study on contraception (IUD), risk factors for severity of viral hepatitis in pregnancy, prevention of perinatal mortality, and reproductive health. She had attended specialized courses in ultrasound scanning and teacher training.

Dr. Sulochana Abraham

Dr. Sulochana Abraham is the Professor in the Dept. of Community Health, in the Christian Medical College, Vellore. She is the Medical Officer for the CHAD (Community Health And Development) programme undertaken by this Department. Since 1976 she is working in this Department. She was graduated (M.B.B.S.) from Christian Medical College, Vellore in 1969.

She holds DGO & MD in Obstetrics and Gynecology and MPH - (Columbia Presbyterian in USA - 1979) degrees. She is a consultant to WHO, World Bank, USAID, UNFPA, SIDA and DANIDA on Primary Health Care, Maternal and Child Health and more recently in Reproductive Health. She is also a consultant to Primary Health Care Programme in Vietnam. She had served as a resource person in Uppsala University, Sweden for the Reproductive Health course during 1997-1998.

Dr.M.K.C.Nair

Dr.M.K.C.Nair is the Associate Professor of Pediatrics in the Trivandrum Medical College. He is also the Director of Child Development Center and Joint Director of Clinical Epidemiology Resource & Training Center.

He holds M.D. degree in Pediatrics, M.Med.Sc. in Epidemiology and Ph.D. in Development Pediatrics. He has been actively involved in teaching undergraduates and postgraduates for nearly 20 years. He is a fellow of Indian Academy of Pediatrics and Indian Association for Child & Adolescent Mental Health. He is the Principal Investigator of "India Safe Trivandrum Project," and UNICEF sponsored "Prevention of Childhood disability" programme. He is a member of Board of Studies (Health Sciences) in the University of Kerala. His contribution to the IAP Text Book of Pediatrics is well known.



Chairman, Dr. P.S.S. Sundar Rao
presiding over the Seminar



Dr. N.S.N. Rao explaining a concept



Dr. Sheela Shenoy emphasising a point



Dr. Sulochana Abraham sharing her views



Dr. M.K.C. Nair enlightening the audience



A section of the audience

MEASURING QUALITY OF MATERNAL & CHILD HEALTH CARE

Dr.Prem P.Talwar
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B-1/1027, Vasanth Kunj, New Delhi - 110 070

ABSTRACT

This paper suggests two types of indicators to measure quality of MCH programme services. One set is needed to monitor quality of programme services, the second set for measuring quality of programme services at a point in time. A need has also been expressed of an analytical study to determine factors which had affected the programme quality so that experience of a particular programme could be set to strengthen quality besides the above two types of indicators: one dimension is programme-built quality, the second is technical quality of services and the third is the degree of satisfaction of clients. Thus there is need for developing nine sets (3x3) of indicators to cover three levels each of the two factors: monitoring, measurement and determining factors affecting satisfaction of clients dimensions of quality of the other factor. This paper lists a suggested set of indicators at these nine levels and indicates sources which could be utilized to collect data on these indicators.

I. Introduction

The success of a programme is assessed not only by the extent it meets needs of the people but also by the degree of satisfaction its services provide to the clients. Two dimensions of its achievements are therefore, quantity and quality. By quantity, one measures the percentage of potential clients whose needs programme is able to meet and by quality, assessment is made how individuals and clients are treated by the system providing services and how far they are satisfied. It is unfortunate that most of the programmes have emphasised the dimension of quantity, many times even at the cost of quality. In search of quantitative achievements, the quality was under-emphasised or even neglected. The realization, now, has come about that it is not possible to improve quantitative achievements beyond a certain level if quality of service does not meet the

expectations of the clients. It is crucial, therefore, to focus on quality even to achieve quantitative targets. Thus quality is important not only as an independent entity, for the satisfaction of people but it could also help to achieve quantitative targets. This paper addresses the measurement of the latter dimension of the programme; namely, quality in the Maternal & Child Health (MCH) services.

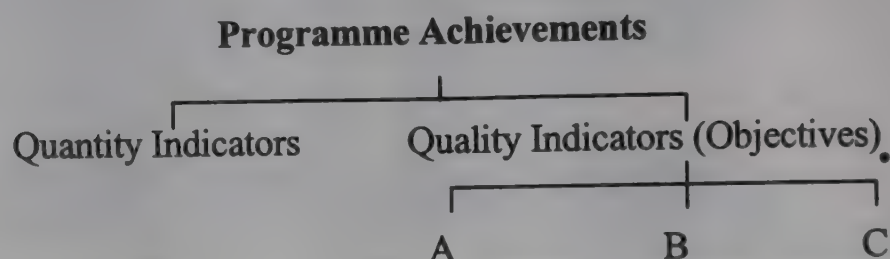
II. Framework to Measure Quality of Services

The quality in a programme needs to be measured basically to achieve goals: (i) it should help to continuously monitor quality of programme services; such continuous monitoring is crucial to achieve the expected/desired level of quality in a programme, and (ii) it should help to measure the level/status of the programme quality at a point in time, so that it can be compared

over time and space and with the expected levels of programme services. As an ancillary, it is also important to determine the factors which have affected quality of the services so that the experience can be used to garner actions to provide good quality services in the existing programme and other such programmes in the future. It may thus be noted that indicators for measurement of quality of programme has to be of two types one set is for continuous monitoring the quality of programme care and the other set for measuring its status at a point in time. The former set is necessary to strengthen the quality of the programme services and latter to measure the programme quality at a point in time. Besides, there is need to analyze factors which have affected the quality of programme services so that experiences of a particular pro-

gramme could be utilized for the programme itself or to better the quality of services for future such programmes. This analysis of factors may be based on a research study. There is need, therefore, to define two sets of indicators suitable for (i) monitoring the quality of a programme, and (ii) measuring the status of quality, and (iii) suggest a design of a research study for analysing factors which had affected the quality.

This paper studies the measurement issues related to the quality of MCH programme at all the three stages - for monitoring the quality of programme, for measurement of quality of the services and to determine factors which affected the quality. In other words, the framework adopted in this paper for quality measurement is:



A : Monitoring Quality (Monitoring)

B : Measuring Status of quality (Status)

C : Determining factors affecting Quality (Affecting factors)

III. Dimensions of Quality of Programme Services

Though two types of indicators are needed - for monitoring and for measuring status of quality at a point in time, one can visualize three broad dimensions of quality of a programme within each of this type: (i) programme built quality of a programme, (ii) technical quality of the services, and (iii) clients' satisfaction with the services. The first dimension consists of those aspects which have been built into a programme like

regimen of services and follow up to be adopted, extent of pre and post counselling, emphases to be laid on different programme services and other such aspects planners of the programme had built into the programme. Every programme sets a norm on all these aspects; the programme is expected to provide services as per these set norms. The second dimension covers technical skills of providers of services and their appropriate utilization while imparting services; it may include items like the number of diagnostic tests, their needs and appropriateness,

procedures of services and under or over prescription of medicines. The third dimension consists of the overall satisfaction of clients with services; it is a composite indicator of several indicators which are related to satisfaction of clients at different stages of receiving services. Thus the first dimension of quality is programme related and programme emphasized and is built into a programme; the second dimension is related to the provider, his skills and professional appropriateness and the third dimension is related with the clients' satisfaction. Though these three dimensions are apparently different yet they reinforce the overall quality of the services; their effect is synergistic.

It is important that measuring quality of services should include indicators of each of these three dimensions. That is, indicators of quality should cover aspects of the programme built quality provider's technical quality of services and the satisfaction of clients. When quality of services is viewed in the overall context of the framework for measuring quality discussed above, one needs three sets of indicators (on each of the three dimensions of quality) for (i) monitoring quality of the programme, (ii) measuring status of quality of the programme at a point in time, and (iii) determining the factors affecting the quality (discussed in the framework). That is, there is need to discuss choice of indicators on MCH care in a 3x3 contingency table. The first factor at three levels is type of indicators discussed in the above framework and the second factor is three dimensions of quality discussed in this section. This paper will, therefore, discuss various indicators related to MCH care in the following 3x3 contingency table:

Type of Indicators	DIMENSIONS OF QUALITY		
	Programme built quality	Technical quality	Clients' Satisfaction
Monitoring			
Status			
Quality Affecting Factors			

An effort is also to be made to indicate design of the study for collecting information on the indicators in each cell of the above contingency table.

IV. Indicators for Monitoring Quality of Services

4.1 Programme-built quality indicators

This group of indicators are meant to monitor quality of services continuously; only those indicators will be included here which are built into the programme services. Though the number of indicators included in this category could depend on sophistication of the programme, a possible list of indicators for MCH care could be:

1. Percent pregnant women registered for ANC care before 16th week of pregnancy
2. Percent high risk pregnancies detected and referred
3. Percent pregnant women with anemia detected and treated
4. Percent institutional deliveries
5. Number of acceptors of spacing methods as percent of all acceptors
6. Number of acceptors of parity 0 and 1 as percent of total acceptors.

These indicators have been suggested on the basis of information author has on the Family Welfare / RCH programme in India. The services in the Indian programme have built these elements of quality in the programme.

All these indicators can be computed by using reports and returns developed for the management information system (MIS) of the programme and the expected level of high risk pregnancies and expected level of anemic pregnant women. These expected level of high risk pregnancies and anemic pregnant women have been discussed in the manual on "Community Need Assessment Approach in Family Welfare Programme" in India. It may be noted that though information on these indicators is generally available from the management information system, there is need to ensure that the MIS has all the information required for these indicators.

4.2 Technical quality of services

The set of indicators in this category are related with the skill of the providers and their usual practices while providing services. It is generally assumed that skills of the providers are good and they use them well and honestly to provide good quality services to clients. Therefore, no effort has generally been made to monitor this aspect of quality of services except in some research studies. But recent literature has belied this assumption; one comes across cases after cases where several unneeded diagnostic procedures are recommended/carried out; more cesarean deliveries are conducted than needed or more medicines are prescribed than needed. All these instances suggest need for monitoring the technical quality of services provided by the health/medical workers. For this purpose, the following indicators may be suggested:

1. Number of diagnostic procedures recommended as percent of required.
2. Number of cesarean deliveries conducted as percent of the total deliveries, and
3. Number of medicines prescribed as percent of the required/appropriate.

This information can be collected by analysis of prescriptions given at a Primary Health Centre (PHC), Community Health Centre (CHC) and/or a Government hospital. A reasonable design may be to select a PHC, a CHC and a hospital every month. Prescriptions of a sample of patients visited on a random day at these service centres may be analyzed with the help of specialists to compute the indicators listed above. Based on the analysis of these prescriptions, it is assumed that some concrete measures will be taken to improve the technical quality of the services provided. Monitoring of these indicators, it is hoped will ensure good technical quality of services.

4.3 Degree of satisfaction of clients

Though information on the degree of satisfaction is generally collected in a demographic/ Family Welfare/ Reproductive Health survey when the users of the services are asked whether they are satisfied with the service they received at the service centres. Sometimes, another question is asked whether they will recommend use of the service to their friends and relatives. These questions are meant to get level of overall satisfaction of clients from the services they received. An answer in positive means that quality of services from clients' perspective is good.

This dimension of quality is generally not monitored but is measured only to determine level of satisfaction of clients. It is recommended that even this dimension of quality should be monitored regularly so that dis -

satisfaction at different stages of receiving services could be minimized and overall degree of satisfaction with the services could be increased. Since the overall satisfaction is composed of satisfaction levels on accessibility/approachability of services, arrangements at the service centres and satisfaction with the interactions with service providers, it will be necessary to monitor satisfaction at each of the above stages. It is satisfaction at each of these stages which ultimately determines popularity or otherwise of the services and thus can greatly influence quantitative achievements of the programme. For this purpose, the following indicators are suggested:

1. Percent distribution of service recipients by time taken to receive service after they left home.
2. Percent service recipients reported satisfaction with the arrangements for registration of patients, waiting period and getting medicines.
3. Percent recipients reported satisfaction at the interactions with the service providers.

These indicators can be computed from Exit interviews of the service recipients. Such exit interviews can be conducted from a sample of clients of PHC, CHC and Government hospital. As suggested above, every month a sample of one PHC, one CHC and one hospital can be taken and exit interviews are conducted (on the questions related to the above indicators) on a sample of those who had come to receive service on that particular day. Based on the responses and the indicator values, it is assumed that actions are taken to increase overall degree of satisfaction of the clients. Continuous monitoring of these indicators will tend to increase satisfaction of clients with services.

V. Measuring Level/Status of Quality of Service

Programmes are monitored on regular basis to improve their overall quality of services. Various indicators have been suggested above to monitor quality of the services. This effort on regular basis should lead to improved quality of services. It is therefore necessary to measure quality of service being provided in a MCH programme at a point in time. This is useful not only as a measure of quality of the MCH programme in an area but could help in comparing quality in time and over space. Therefore this section will discuss various indicators for measuring quality of MCH programme care. As per the 3 x 3 contingency table discussed earlier, these indicators will be discussed in their three dimensions (programme - built quality, technical quality of the services and the degree of satisfaction of the clients).

5.1 Programme-built quality

This category will cover all those indicators which have been built in an MCH programme of a country. In the case of India's MCH programme the indicators could be the following:

1. Percent pregnant women maintaining ANC care registration cards
2. Percent pregnant women completed three ante-natal care check-ups
3. Percent pregnant women received two doses of TT
4. Percent institutional deliveries conducted
5. Percent deliveries conducted by trained personnel
6. Percent children maintain immunization cards

7. Percent children between ages 12-23 months fully immunized
8. Percent diarrhoea cases treated with ORT
9. Percent women counselled on spacing methods
10. Percent recent births with birth intervals of three or more years
11. Percent recent births of birth order two or less
12. Percent recent births to mothers of age less than 20 years
13. Percent recent births to mothers of age more than 35 years

All these indicators can be computed by collecting data from a demographic / Family Welfare / Reproductive Health Survey of the community where women are asked questions related to the above indicators. Though some of these indicators can also be derived from management information system but that information is based on only those clients who had established contact with the health services; it may not relate to the whole community. Besides, there is always a possibility of reporting errors in an MIS. Therefore such community surveys not only give more reliable status picture but also provide opportunity to partly check reliability of information reported through MIS.

5.2 Technical quality of services

Since not much is being done currently to measure technical quality of services, the choice of indicators at present is limited. The one which is often quoted in the newspapers and professional writings is the tendency of obstetricians and gynecologists to perform more cesareans than necessary, particularly for deliveries in private sector service units. Such decisions may have part judgmental

angle and part commercial angle. Thus it is suggested to measure technical quality of service by atleast the following indicator:

Number of cesarean deliveries conducted as percent of the total deliveries

This information can also be collected in a demographic survey by asking women who had delivered babies recently.

5.3 Degree of satisfaction of clients

The set of indicators which may be used in this category are:

1. Percent women reporting satisfaction with the services
2. Percent women who will recommend the services to their friends and relatives
3. Percent distribution of recent service recipients by time taken to receive service after they left home
4. Percent recent service recipients reported satisfaction with the arrangements for registration of patients, waiting period and getting medicines
5. Percent recent service recipients reported satisfaction at the interactions with the service provider

Though the above set of indicators can be computed from information collected in a demographic survey yet it is suggested that such information needs also to be collected by qualitative method of Focus Group Discussions. It is necessary because of the usual tendency among the respondents to report satisfaction with the services they had received sometime back and the basis which they had gone through at that time is likely to be forgotten. The Focus Group Discussions will also be able to give more insights into the

real situation on the level of satisfaction/dissatisfaction.

VI. Determining Factors Affecting Quality of Services

As stated above it is important to know the quality of programme services but it is equally important to understand the factors which had affected the quality. Such information is useful for the programme itself; it is also helpful in improving the quality of services for such programmes in future. Therefore this type of information should also be made a part of the effort where quality of services of a programme is being measured.

Most of the information on the quality of service is / has been suggested to be collected through a demographic / Family Welfare / Reproductive Health survey. There is a need to add a few more questions in such surveys to understand why quality

dimension was overlooked by the service providers or not liked by the clients. Besides addition of questions of the nature of "why"s in community survey questionnaire, it is suggested that this information may also be supplemented by a series of Focus Group Discussions. This methodology has been found to be very good and informative when it is a matter of understanding the behaviour of people.

VII. Summing Up

This paper has suggested several sets of indicators to monitor, measure and understand the dimensions of quality of MCH programme. The methodology to be adopted for collection of related data has also been discussed. This has been done in the spirit of ensuring that needs of individuals are met in a benefitting and satisfactory atmosphere. This is one sure way of making people satisfied with the services; it will also will improve quantitative achievements of a programme.

MEASUREMENT OF QUALITY OF CARE IN RCH PROGRAMMES : A REVIEW

Dr.N.S.N.Rao

Technical Support Unit
United Nations Population Fund
New Delhi

ABSTRACT

Quality is often considered as being sophisticated and expensive, dependent on heavy inputs in terms of equipment, infrastructure and human resources. However, a practical approach to ensuring minimum standards in the field setting, proves cost-effective rather than unaffordable. Quality of services defined as those attributes of a service that reflect adherence to professional standards by the provider, the provision of a wide range of services in a congenial environment, and satisfaction on part of the client or user, should measure programme as a whole. Based on this definition, elements and sub-elements of quality of care are identified and a list of indicators developed.

Introduction

In many of the RCH programmes "quality of services" has not been accorded as much priority as "quantity of services". It has increasingly been felt that improvements in service quality are important for attaining and sustaining the coverage of the services. Since quality services enable clients to meet their reproductive intentions, they contribute to increased adoption and sustained use of services. Quality is often considered as being sophisticated and expensive, dependent on heavy inputs in terms of equipment, infrastructure and human resources. However, a practical approach to ensuring minimum standards in the field setting proves cost-effective rather than unaffordable.

Quality of services is defined as those attributes of a service that reflect adherence to professional standards by the provider, the provision of a wide range of services in a congenial environment, and satisfaction on part of the client or user. Thus quality should measure programme as a whole and not merely quality as applied at the level of clinics or outreach services. Based on this

definition, elements and sub-elements of quality of care are identified and a list of indicators developed for assessing these. A detailed description of all these aspects is presented in this paper.

The elements as identified include the following six basic elements:

1. Choices of Methods
2. Information to Users
3. Technical Competence
4. Client-Provider Interaction
5. Continuity of care
6. Acceptability and Appropriateness

For improving quality of services, it is essential to make the measurement of quality a regular, routine activity within the Programme. As at present, mostly the performance is currently monitored by assessing the achievement of method based on quantitative targets. Measurement of quality of services does not form any significant part of this system.

No single instrument can measure all aspects of quality-a group of measuring tools will be required at each level. The following

criteria may however be applied while developing suitable measuring instruments:

1. Individual instruments of a group should accurately measure service quality prevailing in a given situation, and should be able to reflect changes in quality over time.
2. Each instrument should be simple, brief and easy to administer, by service and evaluation personnel of the Health and FW department.
3. Measurement findings should be quantifiable, with a minimal amount of data analysis.
4. It should be possible to measure quality of services at a given service or management level in a comprehensive manner, by using a small number of instruments.

Methods and tools of Quality Assessment

A review of the available methods and tools based on certain indicators are outlined below.

Choices of Methods

Indicators	Methods and Tools
* Number/range of methods available	* Clinic management system
* Clients referred elsewhere for methods unavailable at SDP	* Observation
* Restrictions placed on available methods	* Focus group discussions
* Client receiving chosen method	* Consumer intercept studies
* Number of methods approved for use at SDP	* Structured interviews
* Methods appropriate to reproductive intentions offered to client by provider	* MIS
* Methods received by the client appropriate to reproductive intentions.	* Stimulated client studies

Information to Users

Indicators	Methods and Tools
* Providers given in-depth information on method accepted	* Observation
* Client correctly explaining method chosen	* Focus group discussions
* Service providers trained in counselling skills	* Structured interview
* Method-specific informational materials available	* Panel studies
* Checklist available on information for provider to cover during counselling session	* Stimulated client studies
* Provider giving overview of all methods	* Counsellor training
* Availability of privacy, acceptable form, counselling and exam	
* VSC consent form available and signed by client	

Technical Competence

Indicators	Methods and Tools
* Existence of written guidelines on FP practice	* Clinic management system
* Capability of Provider to explain contraception; benefits, use, contraindications, side effects	* Observation
* Demonstration of skill at clinical procedures by the provider	* Structured interviews
* Infection control procedures maintained	* MIS
* Client receiving an appropriate method	* Monitoring VSC procedures
* Existence of training criteria for service tasks, mechanism to screen potential service providers, and job descriptions	
* Clinical providers received relevant job training	
* New staff trained in SDP guidelines	
* Periodic refresher training for all staff	
* Availability of appropriate basic items for delivering available methods	
* Adequate frequency and content of supervision	
* Capability for handling HIV, other STDs and RTIs	

Client-Provider Interaction

Indicators	Methods and Tools
* Provider established rapport for assessment of client's personal situation	* Observation & Focus group discussions
* Client reporting feeling welcomed by staff, at ease asking questions, staff were polite	* Structured interviews
* Service provider trained in interpersonal relations	* Stimulated client studies

Continuity of care

Indicators	Methods and Tools
* Ease of re - supply	* Clinic management system
* Clients past due for follow-up are identified and contacted	* MIS
* Identification of Reasons for non-return	* Panel studies
* Appropriateness of Reasons for follow-up schedule	* Focus group discussions
* Client encouraged to return as needed	* Observations

Acceptability and Appropriateness

Indicators	Methods and Tools
* Client perceptions of privacy for counseling and exam, waiting time, time with provider, clinic hours and days, staffing(in terms of gender, ethnic group, age)	* Client satisfaction studies
* Client perceptions of adequacy of waiting room, exam room, cleanliness/hygiene, water, toilet facilities	* Focus group discussions * Panel studies * Patient/ Client flow analysis * Use and discontinuation studies

Methods and Tools

* Clinic management system	* MIS
* Observation	* Stimulated client studies
* Focus group discussions	* Panel studies
* Consumer intercept studies	* Client satisfaction studies
* Structured interviews	* Patient/client flow analysis * Use and discontinuation studies

The description, advantages and disadvantages of the methods are summarised below :

Client Satisfaction Studies

- Description : Used to gain the client's perspective on service delivery organisations
- Advantages : Most applicable methodologies are inexpensive, easy to use, and results can be quickly available.
- Disadvantages : Client satisfaction is difficult to measure.

Clinic Management System

- Description : Software developed by IPPF/WHR which includes modules for basic client history
- Advantages : While service statistics generally only provide an aggregate picture, CMS allows the analysis of individual client histories.
- Disadvantages : Establishing a CMS system is a complicated undertaking.

Consumer/Client Intercept Studies

- Description : An intercept study is a market research technique for gathering data on a sample of people who use a particular product
- Advantages : A way of interviewing a population which would be hard to reach through traditional probability surveys.
- Disadvantages : Difficult to interview people in busy, public places, High rates of non-response

Focus Group Discussions

- Description : Focus group discussions are open discussions on a planned topic led by a facilitator. A guide for the discussion is developed on the basis of research objectives though order is not rigidly fixed.
- Advantages : Provides in - depth information about behaviour and attitudes.
- Disadvantages : Some participants may be inhibited while others may be prone to exaggerate, should not be considered a substitute for quantitative research.

Management Information System (MIS)

- Description : Service statistics are routinely collected from the administrative records which exist in most service provider organisation.
- Advantages : Generally available and easily obtained. Can provide information from the clinic up to the national level.
- Disadvantages : Data must be interpreted. Can only identify areas which warrant further investigation. Although data are available, they are not always used in management decision- making.

Observation

- Description : A qualitative research methodology which can be used alone or in conjunction with other methodologies.
- Advantages : A good tool to assess service delivery context and behaviour.
- Disadvantages : Can produce bias. If period of observation is short may be difficult to make an accurate assessment. Requires skilled observers and analysts.

Panel Studies

- Description : Panel studies consist of interviews with the same individuals over time and are used to measure behavioural changes.
- Advantages : These long term studies can give answers to questions which are otherwise hard to obtain. Can be used to examine service delivery as an individual's reproductive intentions change over time.
- Disadvantages : Panel studies are very expensive. Following individuals over long periods of time can be difficult and many may be lost to follow-up. Attempts to track those who are lost take considerable time and resources.

Patient Flow Analysis / Client Flow Analysis

- Description :** Patient Flow Analysis (PFA) is a computerised system developed by the CDS to perform a time and motion study during one clinic session. It documents utilisation of staff time and patient flow can be used to identify problems in patient flow, determine personnel and space needs, and document personnel costs per patient visit.
- Advantages :** Can help clinic run more efficiently by using staff more effectively, by decreasing client waiting time and reducing personnel cost. PFA is rapid, inexpensive and easily learned. Cost are minimal; the software is free, Collection and analysis of data is easily learned and training can be done in one week.
- Disadvantages :** Doesn't directly address quality of care, just identifies problems. Clinic must then work to develop and implement improvements, difficult to implement without a computer though it has been modified by a VSC for use without a computer.

Simulated / Mystery Client Studies

- Description :** In these studies individuals and / or couples are trained to pose as actual client at a family planning clinic in order to examine the user's perspective
- Advantages :** This is a relatively quick, low-cost technique which enables the direct observation of the clinic staff without their knowledge, so that staff won't be biased or on their "best behaviour". Gives user's not observer's perspective.
- Disadvantages :** Clients will not be able to accurately recall all details in the debriefing session, nor be able to judge the technical competence of the service providers or assess if provider gave complete and accurate information. Information recalled will be distorted client's own understanding and perspective. Must ensure clients remain anonymous or results will be biased. Results will be somewhat biased since staff members will be at their best during the analysis. Assessment will not be completely accurate if spent only one day at each site. Difficult to gain client perspective in a one-day visit.

Structured Interviews / Surveys

- Description :** Structured interviews, or surveys, are common data collection methods; a questionnaire is developed and administered and analysed correctly.
- Advantages :** A good measure of behaviour and practices of family planning clients and service providers. Relatively easy tool to use. Provides quantitative data that can be depending on sample size, representative of the study population. Data analysis is relatively straight forward.
- Disadvantages:** It is important to have skilled interviewers; survey results are largely dependent on them.

Use and Discontinuation Studies

- Description :** Like client satisfaction studies, use and discontinuation studies attempt to obtain the client's perspective on quality of care in service delivery organisation. A client's satisfaction with services is often linked to contraceptive use and subsequent continuation.
- Advantages :** This method gives the researcher the ability to study the client directly. Use / discontinuation may be one of the most important issues in family planning provision.
- Disadvantages :** Use and discontinuation are hard to measure. It is difficult to track discontinuers. Use and discontinuation studies can be very time consuming and expensive depending on the size of the study.

References :

1. UNFPA: Family Planning. Quality of Care: Development of Instruments for Evaluation. Working Group Report. United Nations Population Fund. New Delhi. (Mimeographed)
2. Kartz, Karen et al: Quality of Care in Family Planning. A catalog of Assessment and Improvement Tools. Family Health International. Durham, North Carolina. 1993.
3. Mora, German et al: Quality of Care in Women's Reproductive Health. Working Group Papers. Unpublished. 1993.

ACCESS , QUALITY OF CARE AND EVALUATION OF MATERNAL HEALTH CARE PROGRAMMES

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ABSTRACT

Progress in the maternal health care in India can be assessed by the rapid decline in total fertility rate, maternal mortality ratio and improved access to antenatal care delivery and abortion services. In the reproductive and child health (RCH) programme emphasis has been laid on the participatory approach giving great importance to quality of care rather than target oriented.

Among approximately 585,000 maternal deaths in the world, more than 99% occur in developing countries. Maternal mortality ratios (MMR) (estimated by WHO and UNICEF) of 50-250/100,000 points to problems of quality care for labour and delivery. MMR of more than 250/100,000 suggests problems of quality of care and access as well. Interventions to reduce maternal deaths include:

Reduce the likelihood that a woman will become pregnant, the likelihood that a pregnant woman will experience a serious complication of pregnancy and labour by providing antenatal care and reduce the likelihood of death among those experience complication with emergency obstetric care (EOC).

Access to health care facilities is of paramount importance in the delivery issues of any safe motherhood programme. There are four types of access namely, physical access, geographical access, cultural access and financial access. Access to maternal health is a function of distance from health facility, availability and efficiency of transportation and cost of both health service and transportation.

The three delays model conceptualized by Deborah Maine to explain the delay in access to health may be : delay in deciding to seek care, reaching a treatment facility receiving adequate treatment at the facility. EOC approach is based on three principles. A proportion at least 15-20% of pregnant women will develop obstetric complications. Majority of these complications cannot be predicted or prevented. Women who suffer complications will need prompt EOC to save each life and prevent long term morbidity. Quality of care in the health care facility is an important factor in their survival.

"Good" quality care satisfies the following criteria:

It is accessible and available, acceptable to potential users, have all essential supply and equipment, provide comprehensive care, staffed by technically competent health care providers, involves client in decision making and offer economic and social support to health care providers.

In order to assure quality of care, health services should be evaluated at regular intervals from service provider and client perspective angles. Process and output indicators are designed to measure changes in the steps leading to devised outcome. In general "process" refers to programme activities and "outputs" to the results of these activities.

Introduction

Progress in the maternal health care in India can be assessed by the rapid decline in total fertility rate, infant mortality rate and maternal mortality ratio which may be attributed to improved access to antenatal care, institutional deliveries and improved access to abortion services. However, regional variations and differentials are observed and this has tilted the balance towards lower visibility of many health indicators especially maternal mortality ratios (MMR).

Administrators, policy makers and providers of health care have interest in methods to increase access and utilisation of health care delivery, improve standards of care, evaluation of programmes using many process indicators and finally to implement a cost effective strategy.

Achieving the goals set for 2000 AD is brought out in the new RCH programme and emphasis has been laid on the participatory role rather than target oriented and camp based approach. The new approach which is a bottom up or participatory and community oriented one and giving great importance to quality of care¹.

Approximately 585,000 women die during pregnancy, delivery or during puerperal period within 42 days². Maternal mortality ratio is defined as number of maternal deaths during this period /100,000 live births. Maternal mortality ratios in developed versus developing countries have been estimated by WHO and UNICEF.

DALYS is a concept developed to measure the burden of disease by Murray and Lopez from Harvard University and WHO. This takes into consideration the duration of life which has been lost during

death at each age and the potential years of life lost by disability due to morbid conditions. For this index, various levels of utility are assigned and discount factor for future health is applied. Pregnancy related complications are the leading causes of death and disability among women of reproductive age world wide. They account for the loss of more than twice as many DALYs than STDs, HIV or tuberculosis. Cost effective interventions have been known and World Bank defines that a cost lesser than US \$100/DALY saved is the most cost effective intervention³. If we compare many maternal child health interventions, kindly note that the safe motherhood initiative is most cost effective.

Of all the maternal deaths in the world, more than 99% occur in developing countries. MMR is a major contributor in reproductive age mortality and methods used for estimation are RAMOS Sisterhood Method and indirect measures used by WHO and UNICEF or by UNFPA.

Rough estimates of maternal mortality ratio are useful for advocacy and for planning progress. MMR of 50 - 250/100,000 point to problems of quality of care for labour and delivery. MMR of more than 250/100,000 suggests quality of care and problems of access as well⁴. Specific maternal mortality ratios vary considerably from year to year and should not be used for determining services programme plan or changes in implementation.

Maternal mortality ratio helps to⁵

- * gain a general sense of size of the problem
- * sensitise policy makers, planners to the magnitude of problem
- * stimulate discussion and action
- * mobilise resources for maternal health

Maternal mortality ratios should not be used to

- * Monitor trends and/or measure progress on annual basis
- * Evaluate programme impact
- * Compare geographic areas
- * Allocate resources

Determinants of Maternal Mortality and Morbidity

This conceptual framework gives an idea of determinants of maternal mortality and morbidity and the ways and means in which the interventions help to prevent maternal mortality and morbidity⁶ (Fig 1).

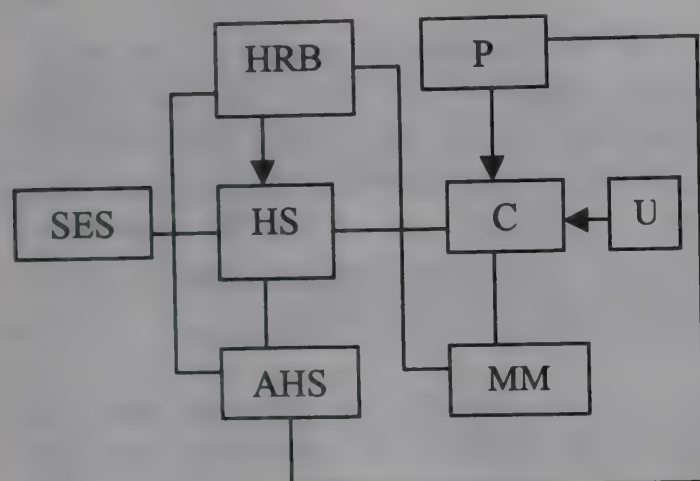


Figure1. Framework for analysing the determinants of maternal mortality proposed by McCarthy and Maine.

- SES : Socio - economic Status
- HRB : Health and reproductive Behaviour
- HS : Health Status
- AHS : Access to Health Services
- P : Pregnancy
- C : Complications
- U : Unknown Factors
- MM : Maternal Mortality

The framework is organised around three general stages or components of the process of maternal mortality. Close to the event are the sequence of situation or outcomes that culminate in either disability or death: these are pregnancy and pregnancy related complications. A woman must be pregnant or experience pregnancy related complications or have pre-existing health problems aggravated by pregnancy before a death is defined as a maternal death. The sequence of events are serially influenced by four sets of intermediate determinants : health and reproductive behaviour, health status of the woman, access to health services and some unknown factors. But the factors which are most important determinants are the distant determinants of maternal deaths.

Interventions to reduce maternal deaths

Based upon the conceptual network, three different interventions have been proposed to reduce maternal deaths. They include:

1. Reduce the likelihood that a woman will become pregnant
2. Reduce the likelihood that a pregnant woman will experience a serious complication of pregnancy and labour
3. Reduce the likelihood of death among women who experience complication.

Reducing fertility is an effective way to reduce maternal deaths in society. It is illustrated by lifetime risk of maternal death which is a function of likelihood of surviving a single pregnancy and the number of pregnancies an average woman bears. Family Planning Programmes help by reducing the number of unwanted pregnancies.

Reducing the incidence of complication of pregnancy has been of focus since woman with prenatal care is 2-22 times less likely to die when compared to woman with no prenatal care.

Analysis of many studies shows that obstetric complications can neither be predicted nor prevented. There are many determinants of maternal deaths like age, parity, socio-economic status, education and occupation of woman.

Risk concept at population level

Table 1 makes it clear that the relative risk⁷ is more in the youngest and oldest age group when compared to the referent group aged 20-29 years.

Table 1. Maternal mortality by age in Matlab, Bangladesh 1968-1970

Age	MM Ratio	Relative risk	No.of live births	No. of maternal deaths
10-14	17.7	3.9	509	9
15-19	17.4	1.6	3907	29
20-29	4.5	1	11,296	51
30-39	5.8	1.3	4,667	27
40-49	6.07	105	447	3

However if one carefully examines the number of deaths only, the picture is very different, as the 20-29 age group has largest number of maternal deaths but has the smallest relative risk. Relative risk concept is used as a guide to tailor advice and treatment to individual patients. But health planners in contrast are less concerned with individual parents but are interested in preventing as many deaths in population as possible. So the concept of high risk pregnancy is less important while considering programs to prevent maternal mortality. All pregnant women are at risk of obstetric complication and they need access to essential obstetric care (EOC) which is effective in treating the complications of pregnancy, which cannot be predicted or prevented.

Access to health care facilities is of paramount importance in the delivery issues of any safe motherhood or reproductive

health initiative. There are 4 types of access namely :

1. Physical access

This denotes the distance traveled to seek a health care facility and determines utilisation of such a set up.

2. Geographical access

This indicates the location of the facility and is applicable in situations such as a hilly terrain or forest area or water logged sites.

3. Cultural access

The acceptability of a health care facility by the population and this is determined by factors such as language, sex or even the race of the provider.

4. Financial access

It is an important factor in the era of limited resources. Health care facilities are becoming out of reach for the poor and hence user fee/charges levied determine their acceptance.

Public health care facility is utilised by a smaller proportion when compared to private institutions/clinics in most of the geographical regions across our country.

EOC approach is based on three principles:

1. A proportion at least 15-20% of pregnant women will develop obstetric complications
2. Majority of these complications cannot be predicted or prevented.
3. Women who suffer complications will need prompt EOC to save their lives and prevent long term morbidity.

EOC does not usually entail building costly facilities. In many developing countries facilities do exist, but

1. Equipment may have gone without repair
2. Drugs are not available
3. Physicians may lack appropriate training

Modest inputs and improved management and supervision are often all that are required for EOC in such facilities to function. Programmes to improve EOC are implemented within the health system.

When EOC services are necessary to reduce maternal mortality they may not be sufficient. There may be barriers to the use of EOC. These may cause delays which in turn may cost a woman's life.

The Three Delays Model⁶

The delays may be :

1. Delay in deciding to seek care
2. Delay in reaching a treatment facility
3. Delay in receiving adequate treatment at the facility .

Delay one : Deciding to seek care

1. Cultural and traditional beliefs that pregnancy and childbirth as normal events which requires little medical attention.
2. Woman's lack of autonomy in decision making or mobility (both constrain woman's health seeking).
3. Families may spend less time, effort and money seeking health care for girls and women.
4. Woman's lack of access to and control over money, may inhibit health seeking.
5. Seclusion practices restrict women's mobility and socialisation: they underplay their own health problems and bear them in silence.

In some communities unless the husband gives consent, no one will accompany or carry the woman to hospital even in case of emergency. Distance to available health facility and efficiency of transportation, cost of health care and cost of transportation will influence people's readiness to seek care.

The reputation of the facility and doctor and the belief that the services are of high quality, make people approach the health care facility.

Delay two: Reaching a medical facility

1. Accessibility of the health facilities will influence this delay.

Access is a function of

1. Distance from health facility
2. Availability and efficiency of transportation.
3. Cost of both health service and transportation

It is also a function of services offered at various levels of health. If no basic EOC is available at a facility, the distance to a "functioning" of EOC is increased.

Delay three: Receiving treatment at a health care facility.

It is important to remember that this delay operates in those who die in hospital: they have overcome barrier in delay 1 & 2 and the quality of care in the health care facility is going to be an important factor in their survival. Examples for this delay may be delay in availability of life saving drugs, blood, facilities for laparotomy, queuing for surgery etc. The provision of EOC function depends upon

1. Number and training of staff
2. Availability of drugs and supplies
3. The general condition of facility

The availability of staff and supplies does not ensure adequate care as these staff and facilities should be available timely and care should be of good quality.

Quality of care is an issue which needs assurance and continued monitoring. Access and quality many a time are linked to one another whereby improvement in quality may lead to greater access.

Key determinants of quality of care include:

Technical competence of the providers' interpersonal skills

Availability of basic supplies and equipment

Quality of physical facilities and infrastructure linkages to other health services and existence of a "functional" referral system.

What is "good" quality care?

"Good" quality care satisfies following criteria:

1. It is accessible and available as close as possible to where women live and lowest level facility can provide services safely and effectively
2. It is acceptable to potential users and responds to cultural and social norms – like privacy, confidentiality and care by female health workers
3. Have on hand all essential supply and equipment
4. Provides comprehensive care, continuity of care and follow up
5. Staffed by technically competent health care providers who rely on clean guidelines/protocols
6. Staffed by workers who provide respectful and non-judgement care, respond to women's needs, provide information and counseling for clients.
7. Involves clients in decision making, sees clients as partners in health care and active participants in protecting their own health.
8. Offer economic and social support to health care providers and enable them to do the best job they can.

In order to assure quality of care, health services should be evaluated at regular intervals from service provider and client perspectives angles.

Why is quality of care important ?

1. Good quality services are cost efficient¹⁰
2. Good quality services are equitable
3. Good quality services are effective
4. Good quality services improve staff morale
5. Good quality services save women's lives

What is poor quality maternal health service?

Poor quality care is one that results in client dissatisfaction or excess morbidity, mortality or related complications or unwanted outcome directly related to the process of care.

Common factors attributable to poor quality care may be substandard care, shortage of supplies and equipment, delayed referral and poor client – provider interactions.

a. Substandard care

This is mainly due to :

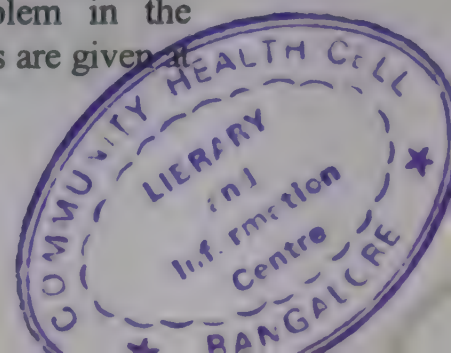
1. Provider not following protocols of management.
2. Staff poorly supervised, underpaid and over-worked and this is the case in many developing countries.
3. Lack of in-service refresher course or continuing education to upgrade the skills.
4. Inconvenient operating hours, services organised at fixed time schedules.

If clients have access to more than one facility, the quality of service may become better as it is the key decision making variable.

b. Shortage of supplies

This is an important problem in the government set up where indents are given at

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the beginning of the year and drugs, gloves, bleach, suture material and parenteral fluids go out of supply and patient has to procure these; short supply of emergency equipment like intravenous canula may even cost a life due to delay in fluid therapy. This leads to frustration among the providers and in turn affect their interaction with patients.

c. Delayed referral

Delayed referral is one of the most important and avoidable factors which prevent women from accepting care required to save their lives.¹¹

Causes may be :

1. Non-recognition of the seriousness of the problem
2. Even if the problem is recognised, no communication facility exists in health facility; system to transport women to referral center is not available; the clients may be unwilling to transport due to financial constraints or due to perceived hindrances in referral center.

To quote few such examples of delayed would be: referral of women following premature rupture of membranes of more than 24 hours; a case of viral hepatitis in pregnancy with hepatic coma; a case of postpartum hemorrhage in irreversible shock and a case of eclampsia with acute renal failure or cerebral hemorrhage.

d. Client-provider interactions

This factor has been the crucial one in management and needs to be addressed. When the client and the relatives are made to understand the problems and complications anticipated, their confidence and compliance improve. Clients are treated in an insensitive manner by not paying adequate attention to their concerns and rude behaviour leads to allegations and litigations. Usually those who are poor and seeking advice or those with late referral are likely to be poorly treated.

Quality of care is differently perceived by clients and providers. Providers are anxious to ensure technical quality while clients are concerned with social support and individual care.

e. Over medicalisation

There is a cry from the public that pregnancy which is a physiological phenomenon is medicalised through specialised technology based models. Some practices like induction of labor, routine episiotomy, electronic foetal monitoring and use of caesarian delivery can be expensive and may increase complications¹².

Over medicalisation leads to high rates of caesarian delivery and other unnecessary surgical procedures. Caesarian section rates are around 25% of all deliveries in major referral hospitals and even higher in private hospitals compared to WHO norms of 5-15%.

Evaluation

It is a valuable tool for improving health programs and using resources widely. Safe Motherhood programme cannot be evaluated by experimental approaches; rather observational designs are used to evaluate success of programme.

Maternal mortality is the impact indicator but being a rare event the fluctuations in maternal mortality whether occurring by chance or by the programme impact may be difficult to evaluate. Moreover evaluation of maternal mortality does not give any idea regarding the components which have given rise to the reduction.

Maternal death case review and audits

Maternal deaths in a facility are assessed and analysed by a local team for causes and circumstances surrounding deaths and to

identify avoidable factors and not attributing blame on the provider. The observations can be used to implement changes such as training the providers, improving access and referral so as to reduce maternal mortality.

As a surrogate measure can reproductive morbidity be taken as an indicator. Reproductive morbidity gains importance and surveys to measure maternal morbidities have been undertaken by task force for validating women's reporting of obstetric complications. Except for anaemia and malaria, they were not implicated in maternal mortality.

Interpreting associations between morbidity trends and programme input are not as straight forward as for mortality. Safe Motherhood programme aims at preventing complication from becoming severe and leading to death rather than preventing complication per se.

Safe Motherhood programme may reduce mortality without reducing obstetric morbidity. When women with a condition may actually increase, women with chronic sequel survive. Only programmes preventing pregnancy complications would be expected to reduce both morbidity and mortality.

Measurement problems compound the morbidity; death is an unambiguous outcome. Even to those trained medically, misclassification of major and minor illness can occur. National surveys on estimate of prolonged labour, eclampsia have not yielded valid or reliable results. Another household survey on the prevalence of induced abortion was similarly flawed.

There has been many studies on reproductive morbidity starting from Maharashtra to Kerala. There has been

studies assessing the sensitivity and specificity of self-reported morbidity, taking clinical and laboratory assessment as gold standard. All these studies have confirmed that the self-reported morbidity may be used to assess problems like prolapse, urinary tract infection (UTI) and reproductive tract infection (RTI).

Facility based data : can it be substituted for population based data?

Maternal mortality or morbidity data from health facilities using facility based/population based records and restores and in depth review of care records can be useful.

The records provide (1) a record of biomedically valid morbidity and mortality (2) A record of outcomes following treatment.

This data is not population based but if we are prepared to assume a certain proportion of women require obstetric procedures in specialized hands to treat serious complications, then health facility based data can be used to derive population based estimates of proportion of women with severe complication who deliver with medically trained attendant.

There can be problems in record keeping in developing countries, treatments and diagnosis may be wrong. Clinical diagnosis shows serious misclassification. Retrospective reviews of existing facility or registers is not a practical tool. Records may be missing. Only broad diagnosis may be available without confirmation.

So a new concept of "Near Miss Algorithm" can be used. Near Miss death event is a serious life threatening complication necessitating an urgent medical intervention in order to prevent the likely death of a mother. Near misses are better

praxis for maternal death and also occur in large enough numbers. The enquiries regarding near miss events may be less threatening to the health care providers and managers. The woman who was saved from death can be interrogated regarding the quality of care of the provider and health care facility. Problems in near miss event may be the severity of the event must be agreed upon. So protocols to identify the near miss event should be developed.

Process and output indicators

These are designed to measure changes in the steps leading to desired outcome. In general "process" refer to programme activities and "outputs" to the results of these activities. The objective is to make inferences about programme success by measuring changes in the process and output indicators, (For measuring the success of health programme, impact indicators like maternal mortality ratios or life time risk of maternal deaths may be used. For a variety of technical reasons, it is difficult to use impact measures like reducing maternal deaths to monitor progress in reducing maternal deaths). So "Process" or programme activity, and "output" results of activities are used.

Process indicators used may be

1. Hospital services (improved drugs, supplies and equipment purchased, staff trained)
2. Blood bank establishment
3. Availability of essential obstetric care
4. Geographic distribution of facility
5. Proportion of births at medical facilities

Output indicators

1. The number of women with complication receiving treatment
2. Time from admission to treatment

3. Proportion of women admitted with complication and who survived
4. Percentage births by caesarean section and fatality rates
5. Case fatality rates

The availability with accessibility of EOC is again brought out by the concept of average interval from onset of complication to death. Obstetric complication can be fatal within hours and access to adequate EOC can decide if a woman lives or dies.

Uptake of emergency care and its impact

- * Key elements of ANC, delivery care, postpartum and (post) abortion care
- * Major obstetrical interventions
- * Emergency transport
- * Analysing local/national treatment protocols for main complications
- * Case by case analysis of deaths and near misses
- * Can stimulate audit
- * Link information to community groups

The main messages

- Promote safe motherhood as a good investment
- Emphasise safe motherhood as a human right
- Delay marriage and first birth
- Acknowledge that every pregnancy is at risk
- Ensure skilled attendance at delivery
- Improve quality and coverage of care
- Increase contraceptive choice
- Address unsafe abortion
- Foster partnership
- Monitor and evaluate

This message was well taken by the providers and the World Bank in the World Development Report 1998, have given great importance to the adult education.

References

1. Reproductive and Child Health programme. Department of Family Welfare; Ministry of Health and Family Welfare, Govt. of India, New Delhi. 1997.
2. Revised 1990 Estimates of Maternal Mortality. A new Approach by WHO & UNICEF. World Health Organisation 1996.
3. James McCarthy and Deborah Maine-A framework for analyzing the determinants of Maternal Mortality. 23(1): 1992: 28-83.
4. Lessons learnt-A decade of Measuring the impact of Safe Motherhood programme DFID Research Work Programme on Population and Reproductive Health. Maternal and Child Epidemiology Unit. 1997.
5. Campbell O. Measuring progress in safe motherhood: presentation at the Safe Motherhood Technical Consultation at Sri Lanka. 18-23 October 1997.
6. Maine D. Safe Motherhood Programme : Options and issues. Columbia University, Centre for Population Family Health, New York, 1991.
7. Chen LC et al. Maternal mortality in rural Bangladesh. Studies in Family Planning. November 1974 : 5 (11) : 337
8. Quality of care; "Doing this the right way" Safe Motherhood Newsletter No.17. WHO. Geneva.
9. Mother baby package: Implementing Safe Motherhood in countries. WHO. Geneva. 1994.
10. Brown LD et al. Quality Assurance of health care in developing countries. The Quality Assurance project. Centre for Human Services, Bethesda MD, undated.
11. Graham W.A. Review of Safe Motherhood: Ministry of Health, Kenya. Options consultancy services Ltd. London.
12. Chalmers B. Over medicalization and appropriate technologies. Presentation at Safe Motherhood Technical Consultation in Sri Lanka. 18-23. Oct. 1997.

ASSESSMENT OF QUALITY OF MATERNAL AND CHILD HEALTH CARE

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ABSTRACT

Emphasis on the quality of care is undoubtedly the cornerstone of any good health care programme. Unfortunately most programmes focus on the numbers covered rather than on how well it is done. To ensure quality of patient care, every programme should build in effective mechanisms to systematically scrutinize the procedures used for diagnosis and treatment and the ensuing outcome for the patient.

The CHAD Programme of the Christian Medical College works closely with the government in providing health care and particularly Maternal and Child Health care in Kaniyambadi block of North Arcot Ambedkar District. This paper describes the CHAD programme's attempt to ensure quality of care at the primary and secondary level and the mechanisms utilized for assessment.

Utmost emphasis on the quality of care is undoubtedly the cornerstone of any good healthcare programme. There is an inherent belief among most health personnel that we are acting at all times in the best possible faith and rendering services of the highest standard. However most programmes focus on the numbers covered and the targets achieved rather than on how well it is done. The sterilization campaign of 1976 is perhaps a good example of this. In a frantic effort to curb the population explosion, large numbers were coerced to accept tubectomy or vasectomy, with no consideration of age or parity or when and where the procedures were done. The drastic result was that people lost faith in the Family Welfare programme which consequently lead to the down fall of the ruling party which was responsible for this hasty step.

To ensure quality of patient care, every programme should build in effective mechanisms, to systematically scrutinise the procedures used for diagnosis and treatment,

the use of resources and the ensuing outcome for the patient.

What is quality health care?

Quality health care has been defined by Roemer and Aquilar (WHO - 1998) as "proper performance of interventions that are known to be safe, that are affordable to the society in question and that have the ability to produce an impact on mortality, morbidity, disability and malnutrition". To understand the concepts of quality of care one needs to look at the methods of measurement.

Audit in accountancy is derived from a Latin word, "Audire" which means, "to hear". One looks at the money spent supported by invoices for good and the receipts for the disbursement. According to the UK Government's white paper, "a medical audit is a systematic critical analysis of quality of medical care, including procedures used for diagnosis and treatment, the use of resources and the resulting outcome for the patient". Essentially, a medical team is asked to support its actions

with reference to (a written record) documented evidence.

Donabedian, the guru of medical audit and quality assurance suggested 3 dimensions to measuring the quality of care. *The structure, pertaining to the amount and nature of facilities and staff available. The second approach is what is done for and to a patient, and how well it is done and final, is the outcome or the end result of the care.*

I would like to briefly describe to you in terms of Donabedian's attributes the Community Health And Development programmes attempt to ensure quality at the primary and secondary level and the mechanisms utilized for assessing the quality.

The CHAD programme of the Christian Medical College works closely with the Government in the delivery of health care and particularly Maternal and Child Health Care in Kaniyambadi block of North Arcot Ambedkar District. At the grass roots is the part time Community Health Worker who is primarily responsible for identifying the pregnant women and motivating her to have antenatal care. The 65 part time Community Health Workers cover a population of 1500 each. The PTCHW gives antenatal, intranatal and postnatal care in her own village. She is also responsible for the care of the under 5, besides giving simple treatment for minor ailments.

Three to four PTCHWs are supervised by Health Aide who has studied upto the 10th and has had a year of inservice training. All the documentation is done by the Health Aide who visits each village once or twice a week. She in turn is supervised by the Public Health Nurse, who covers a population of 15,000 and visits each village fortnightly. The PTCHW and the Health Aide are residents in the villages of Kaniyambadi.

A Doctor - nurse mobile team along with the Health Aide and the PTCHW visits each village once a month. Antenatal women and under 5s are seen at the mobile clinic and the PHN along with the Health Aide follows them up in their homes. The antenatal women who are at a greater risk are referred to the secondary level center where an obstetrician sees them at the high risk clinic held weekly. A review of the problems encountered during the clinic is a routine feature which enables the team to plan follow up activities.

The 80 bedded hospital serves as the secondary care center. 18 to 20% of the antenatal women are referred to the secondary center and 2% are referred to the tertiary care center. The hospital has facilities for seeing outpatients, a labour room, a theater, a simple laboratory, wards as well as a nursery which provides care at affordable cost. 150 to 200 outpatients are seen per day; 200-250 deliveries are conducted with a caesarean rate of 7-10%. The caesarian sections are done under spinal anaesthesia. Besides patients from the block, the hospital has a much wider catchment area for maternal and child health care.

An important tool in the delivery of services is the home based mothers card and the under five card. A survey done in 1978 showed that 7% of cards were lost. Presently, as a result of continuous education all antenatal mothers and mothers of under five consider this an important document and subsequently there is hardly any loss.

A well organized information system contributes significantly to the quality of care. The PTCHW gives information verbally on new antenatals, deliveries, deaths as well as marriages. The Health Aide in turn gives the written information to the PHN who goes through it and checks the quality of data before it is computerized by the statistician. A computer output given back to

the Health Aides helps in updating and in clarifying information. More importantly it helps the personnel involved in the care of the women to plan their visits.

An all staff monthly meeting is the time for feedback when the quality indicators are scrutinised. Some of the indicators that are looked at are the gestation at first visit, tetanus toxoid immunization, the hemoglobin levels, high risk factors identified, outcome of all deliveries, the birth weight, the perinatal and maternal mortality and for the under fives, the nutritional status and immunization. A few of the indicators presented at the last meeting are described in Tables I-VII.

Apart from scrutinising data, the quality is only constantly assessed by direct observation by the supervisors as well as by the peers. The patients satisfaction, an important aspect of quality assurance is assessed by discussions and exit interviews.

At the secondary level, besides the monthly meeting, careful audit of all events are done monthly. Inpatient and outpatient charts review, perinatal mortality audit, caesarian audit and instrumental deliveries are reviewed against the outcome. Protocols provided, go a long way in providing standardized care.

Looking at ethical issues is an important component of quality assurance. Often health personnel face dilemmas which need a second opinion. A ethical review of selected cases once a month has further strengthened our hands. Experts in the respective field from the tertiary care hospitals are invited for these discussions.

Eg. a) A young man is HIV positive. The parents of his betrothed approach you to find out the status. Do you reveal it to them?

b) A young mentally retarded girl is constantly abused and which has resulted in

pregnancy more than once. The distraught parents approach you for help. What do you do?

These are therefore some of the measures which contribute to the assurance of quality of terms in the process and the outcome.

The structural aspects are reviewed six monthly or yearly. With the increasing patient load, the timing of the clinic had to be advanced to enable them to get back their homes before dusk. At the village, timings had to be altered to suit the convenience of a largely agricultural community.

Essentially the whole approach has been a health systems research in providing good quality maternal and child health care. The approach to assessing quality should be non threatening to the staff concerned so that they see it as an asset achieving standards of health care. The important lessons learned were that continued supervision is necessary and that the focus of good quality care should be not in getting numbers of achieving targets but on how it is achieved.

Table I. Proportion receiving antenatal care

ANC	No.	%
Yes	172	97
No	6	3
Total	178	100

Table II. Immunisation status of antenatal women

TT	No.	%
Complete	170	96
Incomplete	2	1
Nil	6	3
Total	178	100

Table III. Gestational age at registration

Weeks	No.	%	Cumulative
<16	105	61	61
17-24	45	26	87
25-32	10	65	93
>32	12	7	100
Total	172	100	

Table IV a. Hemoglobin in early preg - nancy

	No.	%
Yes	161	90
No	17	10
Total	178	100

Table IV b. Hemoglobin in late pregnancy

	No.	%
Yes	104	58
No	74	42
Total	178	100

Table V High risk pregnancies, their care and outcome

No. of high risk cases = 37

V a. No. of high risk pregnancies attending High Risk clinic

HRC attended	No.	%
Yes	11	30
No	26	70
Total	37	100

Table V b. Place of delivery of high risk mothers

Place	No.	%
Home	12	32
Hospital	20	54
Out of Kaniyambadi	5	14
Total	37	100

Table VI. Deliveries by number of living children

Living children	No. of deliveries		
	No.	%	Cum %
L1	64	36	36
L2	65	37	73
L3	38	21	94
L4	10	5	99
L5	1	1	100
Total	178	100	

Table VII. Validation of events - Health Aides and Field Investigators
Population surveyed : 13,964

	Identified by Health Aide (%)	Identified by Field Investigators (%)
Pregnancies	99.1	89.4
Deliveries	99.2	94.8
Deaths	99.2	89.1

EARLY IDENTIFICATION AND INTERVENTION FOR DEVELOPMENTAL DELAYS AND DISABILITY

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ABSTRACT

Introduction:

Success of an ordinary practising doctor in conducting, original research and translating research results into health policy of decisions and actions that lead to facilities that help millions of would be disabled children may be considered important.

Objective :

To present the story of child development research done in Kerala, leading to establishment of Child Development Center, Trivandrum and Government policy actions for prevention of childhood disability throughout Kerala.

Methods :

After return from Clinical Epidemiology Training, two randomized controlled trials were completed, one proving that early interventional therapy done by mother at home is effective in improving neuro-developmental status of babies at risk for developmental delay and another proving that Pyritinol, a widely used drug among the babies with birth asphyxia is not effective. Trivandrum Developmental Screening Chart (TDSC), Grading for Motor Milestones and Nursery Evaluation Scale Trivandrum (NEST) designed & validated by Dr. M.K.C. Nair, for early community detection and therapy as developmental problems through the Integrated Child Development Scheme (ICDS) network are now included in Indian text books of Pediatrics.

Results :

"Action Plan for Child in Kerala" a Government of Kerala policy document for next 5 years has committed in chapter 10, to have prevention of disability programmes establishment through existing Integrated Child Development Scheme (ICDS) functionaries in all districts of Kerala in a phased manner by 1988, using a community model of early intervention. Training is funded by UNICEF and is being done by the doctor and his team and the programme is expected to cover whole of Kerala. A new course, Diploma in Clinical Child Development (DCCD) is started to create core community level trainers. Original research work translated into a cost effective community model has necessitated establishment of a national training center in the form of the first Child Development Center in India which is now registered as an autonomous 'Center of Excellence' in Child Welfare & Development.

Conclusion :

The Kerala model for prevention of disability would be a model for all developing countries, thanks to the efforts of Child Development Center, Trivandrum, UNICEF, Chennai, INCLEN (International Clinical Epidemiology Network) and Government of Kerala.

Every baby follows his or her own unique schedule of development within fairly broad limits; however the general developmental competence of an infant can be assessed clinically. Such assessment may be of only passing interest with respect to a normal and healthy infant, but may take on special significance for a suspected developmentally abnormal infant. The score obtained is not an IQ score, but rather a relatively short term, best estimate of developmental progress. As such, it can prove useful in detecting the precursors of later impairment.

Despite the limitations and controversy surrounding available infant assessment techniques, they continue to have merit as effective means of identifying infants at risk for developmental disabilities later. Identification of risk status can lead to provision of early intervention services aimed at prevention and amelioration of potential problems. The limitations of individual infant assessment techniques, however, must always be taken into account, and attempts to make longterm predictions about a child are not usually warranted. In this regard, infant assessors must be trained professionals like holders of Diploma in Clinical Child Development (DCCD) from Child Development Center, who not only have a sound background in child development but have training in the use of the measures and understand their strengths and limitations.

Developmental Observation Card (DOC):

Developmental disabilities are often seen in infants with no apparent risk factors also.

Hence it is ideal to have some sort of developmental evaluation for all babies. This is possible by using this self-explanatory and simple card (DOC), that can be used by the parents. The large majority of developmental delays could be identified by using cut off points for four simple developmental milestones.

Social Smile - achieved by completed 2 months.

Head holding - achieved by completed 4 months.

Sitting alone - achieved by completed 8 months.

Standing alone - achieved by completed 12 months.

Make sure that your baby see, hear and listen.

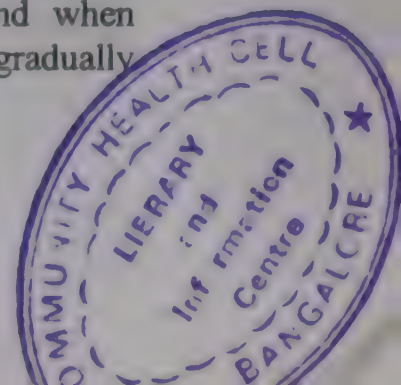
CDC Grading for Motor Milestones

In a new born follow-up programme, when babies are brought for developmental screening at fixed timings of completed 4 months, 8 months and 12 months, it is very advantageous to have a grading so that there is more objectivity in assessment as well as for recording progress.

Infants with Delayed development – Counselling Mothers:

Head holding/neck control:

i) Stimulating the child to hold head by carrying the child in an upright position by supporting the infant's head as and when possible. The support can be gradually



withdrawn depending on the ability of the child to hold head.

ii) While playing and talking with the child, lift the child by supporting his upper arm and chest thereby stimulating him to lift and hold his head. Gradually bring him to the sitting position. Then slowly put him back to the lying position.

iii) The child must be made to lie on his stomach and is guided on his elbows (a roll can be used if necessary). Encourage the child to lift and hold his head by showing a colorful toy. The head holding can then be maintained as long as the child enjoys and then gradually the child is stimulated to rotate the head laterally by moving the toy.

iv) Stimulate the child on stomach lying position (prone position) guiding on his hands on the surface, encourage the child to lift and hold his head and then rotate laterally showing a colorful toy.

v) Encourage the child to lift and hold head by pulling him to sitting position in a playful manner and then gradually putting him back to lying position.

Sitting:

Encourage the child to sit by putting him in an arm chair in a sitting position supporting him with pillows as and when possible. This position can also be used during feeding.

i) While playing and talking with the child, encourage the child to sit with a wide base supported at the pelvis. If necessary help the child to maintain this erect sitting position by showing a colorful toy. Gradually he can be stimulated to turn to either side by moving the toy and also to reach out.

ii) During play child can be encouraged in side sitting position on both sides by supporting himself on the hand to the side which he is sitting. For example, if right side then right hand can be used as the support.

iii) Guide the child to support on his hands and knees (four point kneeling/quadruped position) during play. A roll or pillow can be used if necessary. Help the child to maintain this position by encouraging him through play. If needed minimal support can also be given. Then slowly guide him to sitting on one of his sides, supporting on that particular hand. Help the child to maintain this position for a while. Then guide him again on to his hands and knees and then gradually to side sitting on the other side.

iv) Baby walker can also be used to stimulate and improve sitting.

Standing:

i) Guide the child on to his both knees (up right kneeling) during play time. Firstly support him at the pelvis, if necessary even give support to the upper part of his body. Gradually the support can be withdrawn and the child can be made to support himself by holding on to a low stool. This position can be maintained by directing the child's attention to any play activity.

ii) From the lying on the back (supine position), stimulate the child to pull to sit and gradually to the standing position during play time.

iii) First guide the child on to his knees, supporting on a low stool with both hands, while directing his attention to a colourful toy through play. Slowly help him to raise one of his legs so as to stand on one foot and the

other on knee (Half standing position). Help the child to maintain this position while playing and talking with him. This position can be repeated on other side. Meanwhile depending on the child's ability stimulate him to pull to standing position by himself, supporting on the stool.

iv) Encourage the child in standing position as and when possible, first with support, gradually withdrawing the support given as per the child's ability. A baby walker will also serve the purpose of promoting standing and walking skills.

Early Intervention Therapy - CDC Model:

CDC Thiruvananthapuram model of early intervention as developed at the Child Development Center has evolved itself into a practical mother-oriented stimulation and therapy model, amalgamating experiences of pioneers in the field to problems of working with at-risk babies. This has two inseparable parts described here separately only for convenience sake.

Early Therapy – Developmental Stimulation:

Early stimulation can be applied remarkably to infants at risk during infancy itself, in order to arouse their actions and feelings, ultimately giving them a normal experience of developmental stimulation through interaction with the mother and environment. Unlike a normal baby a brain damaged baby has acquired inability to send adequate signals to the mother and the people around, for them to respond normally and adequately. This then means that an at-risk baby requires more attention of the family members in an effort to prevent mental subnormality setting in, by anticipatory action. Hence the aims of early stimulation are:

- i) Stimulating the child through the normal developmental channel.
- ii) Prevention of developmental delay, both mental and physical.
- iii) Prevention of asymmetries and abnormalities.
- iv) Detection of transient neurological abnormalities and minimization of them becoming persistent abnormalities.

Development depends on the maturation of the nervous system and sensory motor abilities to interpret and use stimulation and also change behavior patterns for more effective functioning in the environment. The newborn baby's life is interrupted by sleep and feedings. From this age, each child's personality begins to evolve. Some are very lively, others are slow to react. But all need to be cuddled, spoken to gently, and stimulated. Moreover, development depends upon the biological inheritance and environmental stimulation on learning. Thus, stimulation plays an important part in early child development. Various locally available, age appropriate toys are advised and the optimum time for stimulation is when the child is most active and playful.

The four major sensory modalities recommended for neonatal developmental intervention include:

- i) Visual Stimulation : Decoration of surroundings, with mobiles and brightly colored objects.
- ii) Auditory Stimulation : Talking, singing, Radio, Television, recorded mother's voice, recorded heart beat and musical toys.
- iii) Tactile Stimulation : Non nutritive sucking, stroking, flexing, massaging, rubbing, handling, positioning etc.

iv) Vestibular - Kinesthetic Stimulation :
Rocking, oscillating beds eg. water beds.

The CDC Model spells out in detail the enormous possibilities for developmental stimulation on each monthly visit and these ideas have been grouped into activities for 0-3 months, 3-6 months, 6-9 months, and 9-12 months.

Early Therapy - Amiel Tison Passive Angles:

Various physical therapy techniques have been used all over the world for children with cerebral palsy and motor delay with encouraging results but not supported by randomized controlled trials. But what has been clinically observed is that child's potential to achieve motor milestones, even if late by months or years is prevented by late onset of therapy and stimulation. Hence the aims of early passive physical therapy are:

- i) To prevent disuse atrophy of muscles.
- ii) To prevent tightening of tendons.
- iii) To prevent fixity of joints.

Each baby also had monthly neurological evaluation using Amiel-Tison passive angles, which forms an important basis for the therapy part of intervention. A limitation in angles indicate "hypertonia" and wide angles indicate "hypotonia". For example the adductor angle (angle between the thighs) if found limited while separating the thighs with the legs straight indicate hypertonia may be leading to cerebral palsy. Hypotonia to certain extent is no cause for alarm as it could be quite normal in babies and does not interfere with the development and the tone gets more or less normalized with age. If the hypotonia is a hindrance for the child in achieving his developmental milestones, then during therapy care is taken to give joint compression in the weight bearing position in different developmental postures.

Hypertonia requires Reciprocal Rhythmic Repetitive (RRP) movements passively of the joint showing limitation. As per rule the whole limb (both upper and lower extremities) is treated instead of only one component. For example even if there is only adductor spasticity (i.e. limitation in adductor angles), instead of only relaxing the adductor the other components viz. flexors, extensor, abductors of hip, knee and ankle joint are also considered. Always remember that an irritable child will become more and more stiff and hence any passive therapy should be done in a playful manner.

Trivandrum Developmental Screening Chart (TDSC)

This is a simple developmental screening test designed and validated at the Child Development Center, Trivandrum. It is being used in the Child Development Clinics and for Community Screening of Developmental Delay among the children below 2 years of age. It takes only 5-7 minutes to administer this test. There are 17 test items in the chart, carefully chosen after repeated trial and error. The age range of each test item is taken from the norms given in the Bayley Scales of Infant Development (BSID). The right hand side of each horizontal dark line represents age at which 97% of the children passed the item in the Baroda sample. A vertical line is drawn or a pencil kept vertically, at the chronological age of the child being tested. If the child fails to achieve any item that falls short on the left side of the vertical line, the child is considered to have a developmental delay. Any obvious asymmetry is also considered abnormal.

Childhood Disability:

Traditionally the problem of disability have been looked at and analyzed after the problem has manifested clinically. Our attempts looking for possible causative factors,

have often been speculative. Depending on the background of the professional dealing with disability the retrospective search identify very many varied causative factors, neurological, educational or psychological. Experience of the Child Development Center (CDC), Trivandrum, suggest that a more appropriate approach would be to have an at-risk baby follow-up programme to identify babies at risk for developmental problems and offer early stimulation therapy at home by the mother in the first year of life itself. The research data of CDC has conclusively proved that early stimulation for at-risk babies is effective in improving the neuro developmental status of neonatal nursery graduates¹. It has also been proved that Pyritinol, the widely used so called "neuro tonic" is not effective².

For too long, we have been concentrating either on congenital and development syndromes or on environmental risk, thus ignoring the neonatal nursery graduates with various biological risk. Low birth weight babies, with increased risk for hypoxia, hypothermia, hypoglycemia, hyperbilirubinaemia and neonatal convulsions may be taken as the prototype of this group. More than 30% of the babies born in India belong to the less than 2500 grams group and even in a state like Kerala with infant mortality as low as 13 per 1000 livebirths, the situation is no different. The concept of "double vulnerability" meaning that a baby with a biological risk factor like low birth weight is more likely to fare poorly, if born into a family with poor child rearing capabilities as compared to one with a positive environment, becomes very relevant in the Indian context.

The Child Development Center data shows that for increase of every 500 grams there is a significant and consistent increase in the mean value of the developmental outcomes of mental Development Index (MDI) and Psychomotor Development Index (PDI).

Similarly the observation that in every birth weight group the mean values of MDI & PDI are higher for the early stimulation group as compared to the control group is clinically very relevant¹. Thus low birthweight babies form the priority group for receiving early stimulation therapy. Experience of the developed countries has shown that a multidisciplinary early intervention programme would offer beneficial effects not only to the infant at risk but also to the family, although opinions would differ as to the extent to benefit and the sophistication of services to be provided. Hence the ideal approach in the Indian context would be to incorporate concept of developmental monitoring into the massive Integrated Child Development Scheme (ICDS). This would involve:

- i) Neonatal follow up and early stimulation therapy for all newborn nursery graduates (At-risk for developmental delay and later on scholastic problems) using CDC grading for motor mile stones and CDC model early stimulation therapy^{3,4}.
- ii) Developmental monitoring of less than two years old children using assessment and therapy based on Trivandrum Developmental Screening Chart (TDSC) developed and validated at the Child Development Center⁵.
- iii) Developmental monitoring of pre-school children between ages of 2 and 6 using assessment and therapy based on Nursery Evaluation Scale Trivandrum (NEST) developed and validated at the Child Development Center⁶.
- iv) Nutrition, Health and Family life education for pre-adolescent and adolescent future mothers in an effort to improve nutritional status and thus in turn reduce burden of low birthweight babies being born^{7,8,9}.
- v) Rubella vaccination to adolescent girls to reduce congenital rubella syndrome, cataract and isolated hearing loss in children¹⁰.

Subtle developmental deficits occurring in children may go undetected till they reach school age. The present health delivery system pays no attention to this vital point. Advances in perinatal care and the establishment of neonatal nurseries have improved the survival chances of many newborns, who would otherwise have succumbed. This tends to increase the chances of childhood developmental delay, speech problems, behavioral problems, attention defect hyperkinetic disorder (ADHD), scholastic backwardness, learning disorders and dyslexia. Very often their problems are identified quite late, may be at school age when only some rehabilitation measures can be taken which do not necessarily bring out the best in the child.

A substantial correlation between MDI scores below 2 years and WISC-R IQ at age eight years have been reported^{11,12}. It has also been noted that some children with sub optimal performance at two years showed remarkable improvement by five years of age¹³.

Most of us faced the dilemma as to what to do when we are presented with a child admitted to a sophisticated English medium primary school not able to cope with school routines and with behavioral problems, hyperactivity etc. We wish if only the parents had bothered to bring the child much earlier before all this problems had set in. On the other hand we also realize it as impracticable to assess every child before he is put into a primary school. In fact even if we make a system of pre-school screening, it will be used more for discriminating and discarding rather than for identifying children, who needs special care. The preschool teacher is in a unique position to observe, interact and encourage a preschool child leisurely and under more natural setting. Assessment of a

child in a clinical setting by a developmental pediatrician or a psychologist is a possibility only for a selected few and hence the basic screening of preschool children would be possible only by the preschool teachers provided they have a simple screening tool. Nursery Evaluation Scale Trivandrum (NEST) is one such simple tool developed and validated at Child Development Center, Trivandrum⁶. It consists of items on the gross Motor, Fine Motor, Cognitive, Personal Social, Expressive Language and Receptive Language. This test is designed for the children belonging to the age group 4 to 6 years (preschool). The Scale has been standardized on a sample of 613 children. The item chosen for NEST is based on the developmental and educational theories.

In a study conducted among primary school children of a Government school in Trivandrum using Draw-a-man test as the measure of intellectual performance, it was observed that in all the age groups the percentages of children with subnormal performance was between 9 and 10% with a mean of 9.5% for the whole group, and a 95% confidence interval of 8.3 to 10.7. It was also observed that the percentage of children with abnormal performance of the whole group was 2.88 and thus needing detailed intelligence and psychological assessment^{14,15}. Thus it becomes apparent that the antecedents of dyslexia should be identified much before child enters formal education. Considering the amount of efforts and funds required to identify and offer remedial services for each case of dyslexia, in a massive country like India with possibly millions of children with dyslexia the most cost effective strategy would be to identify antecedents of dyslexia before the child enters Class-1.

References

1. Nair MKC. Developmental outcome of at-risk new borns and the effect of early intervention. Ph.D.Thesis, University of Kerala,1996.
2. Nair MKC. A Randomized controlled trial of Pyritinol among term post asphyxial encephalopathy babies. M.Med.Sc., New Castle University, Australia.
3. Nair MKC, Babu George, Sabarinathan K,et al. CDC Grading of Motor Milestones. IAP Journal of Practical Pediatrics 1995; 3:53-54.
4. Nair MKC, Suja Mathews, Babu George, Elsie Philip, Sathy N. Early Stimulation: CDC Trivandrum Model. Indian J Pediatr 1992; 59 : 663 - 667.
5. Nair MKC, George B, Philip E. Trivandrum Developmental Screening Chart, Indian Pediatr. 1991,28:869.
6. Nair MKC. Nursery Evaluation Scale Trivandrum (NEST). In:Growth & Development, Eds. DK Mukherjee, MKC Nair. Published by Dilip Mukherjee on behalf of Growth & Development Chapter, Indian Academy of Pediatrics, 9/1 Ramnath Pal Road, Calcutta - 700 023.1996;44.
7. Nair MKC. Family life education for adolescents, State Aids Cell, Trivandrum. 1995;3-19.
8. Nair MKC. Recommendations of the Indian Academy of Pediatrics Committee on Adolescents, Child Development Centre, Medical College Campus, Trivandrum. 1996.
9. Hire SS, Genatra. Determinants of low Birthweight: A community based prospective cohort study. Indian Pediatrics, 1994;31:1221-1225.
10. Orenstein WA, Bart SW, Bart KJ, et al. Epidemiology of Rubella and its complications. In: Gruenberg EM, Lewis C, Goldston SE,eds, Vaccinating against Brain Syndromes The campaign against measles and rubella; Oxford University press 1986;52.
11. David Wechsler. Wechsler Intelligence Scale for children Revised (WISC-R) 1974. Tests, Products and Services for psychological Assessment Catalog. The psychological Corporation. Harcourt Brace Jovanovich, Publishers 1985;5-7.
12. Kitchen WH. Victorian Infant Collaborative Study Group. Eight year outcome in infants with birthweight of 500 to 999 grams: continuing regional study of 1979 and 1980 births. J Pediatr 1991;118:761-767.
13. Kitchen WH, Ford GW, Rickards AL, Lissenden JV, Ryan MM. Children of birth weight less than 1000 grams: Changing outcome between ages 2 and 5 years. J Pediatr 1987;110:283 -288.
14. Phatak P. Draw-a-man test for Indian Children. 2nd ed. Pune, Anand Agencies, 1987.
15. Shifa S, Nair MKC, Babu George. Prevalence of intellectual subnormality among primary school children. Thesis of Diploma in Clinical Child Development (DCCD'97) at Child Development Centre, Trivandrum.

DISCUSSION

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The satisfaction of clients is the most important aspect in achieving targets in social welfare programmes particularly health and family welfare programmes. This compels the programme administrators to look into quality of services offered to the clients. Hence it is necessary to develop suitable methodology to measure quality of the health programme.

Dr.P.P.Talwar in his paper entitled, "Measuring Quality of Maternal & Child Health Care", presents the framework for measuring quality of services. He points out that the quality should be assessed 1) on a concurrent basis, 2) at a point of time to assess the status/level and 3) factors affecting quality of services as found in 1) and 2) above. In routine programmes, in-depth information on quality of services may be difficult to incorporate as part of 1) and 2), and hence 3) must be a detailed study to be undertaken separately. He considers three broad dimensions of quality of a programme namely programme-built quality, technical quality of the provider and clients' satisfaction. He indicates illustrative indicators for these three dimensions, giving several indicators for programme-built quality. The Evaluators following his ideas appropriate to the specific component of MCH programme can generate many new indicators. This paper provides the important background to design studies to evaluate quality of services. However, there is scope for further refinements in designing and conducting such studies.

Dr.N.S.N. Rao in his paper, "Measurement of Quality of Care in RCH Programmes: A Review", throws light on methods and tools of quality assessment. The indicators outlined by him are drawn from the major component of RCH programme, namely, family welfare programme. He has well documented the advantages and disadvantages of various methods of measuring quality of services. Following his illustrations, one may develop several indicators covering the other components of RCH.

Drs. Sheela Shenoy and Shenoy in their paper, "Access, Quality of Care and Evaluation of Maternal Health Care Programmes", focussed attention on the measurement of quality of care in preventing maternal deaths, specifically with the hospital as a base of service. Several illuminating questions are raised to help in designing studies in this area at the hospital set up.

The child component of MCH has not been covered in detail in these papers. Further, quality of care at the Primary Health Center set up has not been given its due share. Further fieldwork is needed to test out several indicators to get parsimonious list of indicators requiring the least resources of time and personnel.

In the larger perspectives of measuring quality of services, I wish to suggest few more indicators under 4 categories. They are only indicative and not exhaustive.

a) Community:

Community perception of a given component of MCH

Community perception of health workers.

Community perception of the location, distance and other physical availability of health facility.

b) Clients:

Satisfaction on care/treatment, waiting time, ability to explain the treatment received.

The name of vaccine given to the child, the schedule of a given vaccination, care for side effects of vaccination.

Use of ORS, symptoms and care of ARI etc.

c) Worker:

Distance of residence of the worker to the community, ability to provide health information / education to the community, receipt of periodic refresher training, possession of appropriate materials/kits for service etc.

d) Supervisor:

Periodicity of worker supervision, man-days lost per worker per month, number of personnel present at staff meet to the total personnel, proportion of personnel staying in the headquarter village and reasons for not staying etc.

CHAIRMAN'S CONCLUDING REMARKS

(Dr. P.S.S. Sundar Rao
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We have listened to very erudite presentation by various experts. Dr.N.S.N. Rao described the framework for measuring 'quality of care' in RCH programmes. In his presentation, he identified six basic elements, viz a) Choices of Methods, b) Information to Users, c) Technical Competence, d) Client-Provider Interaction, e) Continuity of Care and f) Acceptability and Appropriateness. He emphasized the need to make measurement of quality, an essential regular activity within any programme. He has suggested a package of instrument to measure quality at various levels. I am sure his presentation has clarified a number of pertinent points relating to our ability to measure the quality of care. In the second presentation, Dr. Sheela Shenoy described how to measure access to health care facilities and described four types of access viz a) Physical Access, b) Geographic Access, c) Cultural Access and d) Financial Access. In her stimulating presentation she described essential obstetric care (EOC) and measurement of access to EOC by which maternal mortality or morbidity can be prevented. She also described three models of "Delay" and summarized what is 'good' quality care. Various process and output indicators were also mentioned.

The third presentation by Dr. Sulochana Abraham on "Assessment of Quality of Maternal and Child Health Care", dealt with the CHAD programme of Christian Medical College wherein quality service was incorporated at various levels into the routine services. She described how at the grassroots level, the Part Time Community Health Workers were made responsible for essential MCH care and the system by which quality care is monitored. Essentially, the whole approach has been through Health System Research in providing quality MCH care. The last presentation by Dr.Nair was on measuring quality of care in preventing childhood disability. He described the programme at the Child Development Centre (CDC) in Kerala, whereby through practical approaches using mothers in handling at-risk babies, a successful outcome was achieved. His presentation was supported by results of various studies and he concluded that the CDC model used various quality measures for preventing disability of children. The participants took active part in discussing each presentation and clarified various points. The seminar has benefited all the members of the ISMS and we hope the report will be of greater use for all those interested in providing quality MCH or RCH care.

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